

WO 2004/045720

PCT/AU2003/001526

REPLACED DRAFT
ANT 3/4/2007

- 4 -

pressurised or unpressurised air stream under water or on or near the surface of a body of water or elsewhere.

SUMMARY OF THE INVENTION

5

Throughout this specification, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element or integer or group of elements or integers but not the exclusion of any other element or integer or group of elements 10 or integers. Reference to "air" includes a reference to gas or gas combinations suitable for breathing. Relevant examples include Nitrox and Heliose products.

In one aspect, the invention resides in a modified breathing apparatus for medicating an airstream, the modified breathing apparatus comprising:

15

a breathing apparatus;
a medication chamber adapted to store and discharge a therapeutic agent;
a delivery pathway between the chamber and an intake air pathway of the breathing apparatus; and
releasing means for selectively discharging the therapeutic agent from the 20 chamber into the intake air pathway.

25

The breathing apparatus may comprise an arrangement, or part thereof, for underwater activity. The breathing apparatus may be a regulator suitable for delivery of air from a source of compressed air, either alone or in combination with another apparatus. The breathing apparatus may comprise a scuba arrangement or part thereof. The breathing apparatus may comprise a snorkel or part thereof. The breathing apparatus may comprise a gas mask, a filter mask, a respiratory mask or similar. The breathing apparatus may comprise a conduit for channelling inspiratory air. The breathing apparatus may comprise a rebreather which may be 30 closed or semi-closed.

BEST AVAILABLE COPY

- 11 -

Alternatively, the discharge means may comprise an arrangement for dispersing a powder or liquid. The arrangement may include a rotatable blade or blades for dispensing a powder or liquid into an intake air stream.

- 5 The control means may include a flow control valve for directing air through a detour air pathway additional to the main air pathway of the snorkel.

In still a further aspect, the invention resides in a medication chamber for use in medicating an air stream in an air channelling device, the medication chamber comprising:

- an outer housing defining an internal chamber containing a therapeutic agent;
- mounting means for fixing the medication chamber to the air channelling device;
- 15 at least one delivery path from the internal chamber externally and adapted to deliver the therapeutic agent to an air pathway in the air channelling device; and releasing means for releasing the therapeutic agent from the internal chamber.
- 20 The outer housing may be formed of one or more of plastic, polyvinyl chloride, PEEK, alloy, titanium or other suitable material. It may be formed in two interengageable sections. The two sections may be screw threadably engaged.

- 25 The therapeutic agent may be any suitable agent including albuterol, salbutamol (Ventolin®), beconase (Becotide®), adrenaline, aminophylline, or glucose.

The therapeutic agent may be held in a pressurised container with a release valve. The therapeutic agent may be a solid, liquid or gas.

- 30 The mounting means may comprise one or more recesses or slots for receiving a fixing device such as a screw and/or guide tab. The medication chamber may be

- 13 -

disassembly of the outer housing.

The outer housing may further comprise an inlet pathway for receiving a pressurised air supply. The outer housing may also comprise an outlet valve for
5 discharging air from the internal chamber when air pressure inside the chamber exceeds pressure outside the chamber.

In yet another aspect, the invention may reside in a method of medicating an air stream in a breathing apparatus, the method comprising the steps of:

10 mounting a chamber containing a therapeutic agent to a breathing apparatus; and

introducing one or more doses of the therapeutic agent into an inlet pathway for inspiratory air.

15 Mounting the chamber may comprise forming the chamber integrally with the breathing apparatus or forming a separate chamber and reversibly or permanently mounting it to the breathing apparatus .

The method may include the step of positioning a container holding the therapeutic
20 agent in the chamber. The container may be a pressurised container.

Introducing one or more doses of the therapeutic agent may include the step of activating an agent releasing mechanism such as depressing a button, rotating a control dial, knob or lever, or other voluntary action to release a dose of
25 therapeutic agent. Introducing the therapeutic agent into an inlet pathway may comprise the step of introducing the agent directly into the inlet pathway from the chamber or, alternatively, through a delivery air pathway from the chamber to the inlet pathway.

30 BRIEF DESCRIPTION OF THE DRAWINGS

PCT 3A ANDT
CLAIMS:

1. A modified breathing apparatus for medicating an air stream, said modified breathing apparatus comprising:
 - 5 a breathing apparatus comprising one of a regulator suitable for delivering air from a source of compressed air, the regulator adapted for use in scuba gear, aircraft applications, gas masks, hazardous environments, mountaineering, power assisted respirators and other similar applications, a snorkel or part thereof, a rebreathing device or a self-contained breathing apparatus;
 - 10 a medication chamber adapted to store and discharge a therapeutic agent; a delivery pathway between the chamber and an intake air pathway of the breathing apparatus; and releasing means for selectively discharging the therapeutic agent from the chamber into the intake air pathway through the delivery pathway.
- 15 2. The modified breathing apparatus of claim 1 wherein the breathing apparatus is a second stage regulator for scuba diving.
- 20 3. The modified breathing apparatus of claim 1 wherein the breathing apparatus is a snorkel or part thereof.
- 25 4. The modified breathing apparatus of claim 1 wherein the breathing apparatus is a self-contained breathing apparatus ("SCBA") suitable for use in firefighting and rescue, Industry, shipping, mining, mountaineering, hazardous environment, aircraft and/or conditions of higher or lower atmospheric pressure.
- 30 5. The modified breathing apparatus of claim 1 wherein the medication chamber is sealed to resist entry of water, mud, dust or other contaminants.
6. The modified breathing apparatus of claim 5, wherein the therapeutic agent is housed in a container, said container adapted to locate in the medication chamber.

DET 2A P/MNT

33. A medication chamber for use in medicating an air stream, the medication chamber comprising:

an outer housing defining an internal chamber containing a therapeutic agent;

5 mounting means for fixing the medication chamber to an air channelling device, said air channelling device comprising regulator adapted for use in scuba gear, aircraft applications, gas masks, hazardous environments, mountaineering, power assisted respirators and other similar applications, , a snorkel or part thereof, a rebreathing device or a self-contained breathing apparatus;

10 at least one delivery path from the internal chamber externally and adapted to deliver the therapeutic agent to an air pathway in the air channelling device; and
releasing means for releasing the therapeutic agent from the internal chamber.

15 34. The medication chamber of claim 33 wherein the outer housing is formed of metal, plastic or polyvinyl chloride.

35. The medication chamber of claim 33 wherein the internal chamber is sealed to resist entry of water, mud, dust or other contaminants.

20 36. The medication chamber of claim 33 wherein the outer housing is formed as two interengageable sections.

25 37. The medication chamber of claim 36 wherein the two sections are screw threadably engageable.

38. The medication chamber of claim 33 wherein the therapeutic agent is any one of more of salbutamol, Beconase, adrenaline, aminophylline or glucose.

30 39. The medication chamber of claim 33 wherein the therapeutic agent is held in a pressurised container having a release valve, the pressurisable container

PAT 34 patent

locatable inside the outer housing.

40. The medication chamber of claim 33 wherein the mounting means
5 comprises one or more recesses or slots for receiving a fixing or locating device
such as a screw and/or a guide tab.

41. The medication chamber of claim 33 wherein the at least one delivery path
10 is an outlet channel in communication with the release valve of the pressurised
container.

42. The medication chamber of claim 39 wherein the releasing means includes
a rotatable dial for activating a cammed mechanism to displace the canister and
operate the release valve to thereby discharge a dose of therapeutic agent.

16 43. The medication chamber of claim 42 wherein the cammed mechanism
operates a slidable seat to activate the release valve of the pressurised canister.

44. The medication chamber of claim 39 wherein the releasing means includes
20 a pressure activated button for displacing the canister or the seat and activating
the release valve.

45. The medication chamber of claim 33 wherein the releasing means
comprises a mechanism for delivering a powder to the air pathway.

25 46. The medication chamber of claim 45 wherein the mechanism comprises a
geared arrangement for advancing and opening a blister pack to present the
powdered agent contained therein to the air pathway.

30 47. The medication chamber of claim 45 wherein the mechanism comprises a
rotatable dispenser for dispensing a powdered agent to the air pathway.

WO 2004/045720

PCT/AU2003/001526

- 37 -

CLAIMS:

1. A modified breathing apparatus for medicating an air stream, said modified breathing apparatus comprising:
 - 5 a breathing apparatus;
 - a medication chamber adapted to store and discharge a therapeutic agent;
 - a delivery pathway between the chamber and an intake air pathway of the breathing apparatus; and
 - 10 releasing means for selectively discharging the therapeutic agent from the chamber into the intake air pathway.
2. The modified breathing apparatus of claim 1 wherein the breathing apparatus is selected from a regulator suitable for delivering air from a source of compressed air, a snorkel or part thereof, a gas mask, a filter mask, a rebreathing device or a respiratory mask.
- 15 3. The modified breathing apparatus of claim 2 wherein the breathing apparatus is a second stage regulator for scuba diving.
- 20 4. The modified breathing apparatus of claim 1 wherein the medication chamber is sealed to resist entry of water, mud, dust or other contaminants.
5. The modified breathing apparatus of claim 4, wherein the therapeutic agent is housed in a container, said container adapted to locate in the medication chamber.
- 25 6. The modified breathing apparatus of claim 1 wherein the medication chamber is formed integrally with the breathing apparatus.
- 30 7. The modified breathing apparatus of claim 1 wherein the medication chamber is formed for releasable engagement with the breathing apparatus.

- 38 -

8. The modified breathing apparatus of claim 1 further comprising balance means for substantially equalising pressure in the chamber with ambient pressure.
- 5 9. The modified breathing apparatus of claim 5 wherein the container for housing the therapeutic agent is a pressurised canister.
10. The modified breathing apparatus of claim 9 wherein the pressurised canister has a release valve which is pressure activated to discharge the therapeutic agent.
11. The modified breathing apparatus of claim 1 wherein the therapeutic agent is one or more of albuterol, salbutamol, adrenaline, beconase or glucose.
- 15 12. The modified breathing apparatus of claim 5 wherein the container comprises a capsule, a gelatine capsule or a blister pack.
13. The modified breathing apparatus of claim 1 wherein the delivery pathway is formed by the chamber being disposed along the intake airway or pathway.
- 20 14. The modified breathing apparatus of claim 1 wherein the delivery pathway is a bore, channel or aperture.
15. The modified breathing apparatus of claim 14 wherein the delivery pathway is a detour pathway adapted to direct some or all of the intake air through the chamber.
- 25 16. The modified breathing apparatus of claim 14 wherein the delivery pathway includes valve means operable to open and close the bore, channel or aperture.
- 30 17. The modified breathing apparatus of claim 16 wherein the valve means is a

- 39 -

slide lock.

18. The modified breathing apparatus of claim 17 wherein the slide lock includes locking means to prevent unintentional activation.

5

19. The modified breathing apparatus of claim 18 wherein the locking means is a locking nut.

10 20. The modified breathing apparatus of 14 wherein the delivery pathway is formed by two or more separate pathways between the chamber and the intake air pathway.

15 21. The modified breathing apparatus of claim 9 wherein the releasing means comprises a rotatable dial or control for activating a displacement mechanism to displace the pressurised canister or a seat co-operating with the canister and thereby activate the release valve of the pressurised canister.

20 22. The modified breathing apparatus of claim 21 wherein the displacement means is a cam operated slide positioned in the medication chamber.

20

23. The modified breathing apparatus of claim 1 wherein a rotatable dial or control operates a mechanism to displace a measured amount of therapeutic agent and position it in the delivery pathway for discharge into the intake air pathway.

25

24. The modified breathing apparatus of claim 9 wherein the releasing means includes a pressure activated button for displacing the canister or a seat cooperating with the canister to discharge the therapeutic agent through a release valve of the pressurised container.

30

25. The modified breathing apparatus of claim 24 wherein displacement of the

- 40 -

seat or canister clears one or more apertures to provide or open the delivery pathway.

26. The modified breathing apparatus of any one of claims 21, 23 or 24 wherein
5 depression of a pressure activated button or rotation of a rotatable dial or control
rotates a delivery chute into a discharge position from an inactive position.

27. The modified breathing apparatus of claim 26 wherein rotation of the
delivery chute clears one or more apertures to provide the delivery pathway.

10 28. The modified breathing apparatus of claim 1 further including counting
means for indicating, at least approximately, the number of doses of therapeutic
agent that have been discharged from the medication chamber.

15 29. The modified breathing apparatus of claim 28 wherein the counting means
is formed as one or apertures in the chamber wall with moveable indicia visible
therethrough, said moveable indicia providing an indication of either or both the
number of dosages discharged from the chamber or the level of residual
therapeutic agent in the chamber.

20 30. The modified breathing apparatus of claim 1 wherein a mouthpiece is
formed to provide separation between the teeth of a user.

31. The modified breathing apparatus of claim 30 wherein the mouthpiece has
25 an upper shield for receiving the upper teeth and a lower shield for receiving the
lower teeth and an inlet aperture positioned between the upper and lower shields.

32. A medication chamber for use in medicating an air stream, the medication
chamber comprising:

30 an outer housing defining an internal chamber containing a therapeutic
agent;

- 41 -

mounting means for fixing the medication chamber to an air channelling device;

5 at least one delivery path from the internal chamber externally and adaptable to delivery the therapeutic agent to an air pathway in the air channelling device; and

releasing means for releasing the therapeutic agent from the internal chamber.

33. The medication chamber of claim 32 wherein the outer housing is formed of
10 metal, plastic or polyvinyl chloride.

34. The medication chamber of claim 32 wherein the internal chamber is sealed to resist entry of water, mud, dust or other contaminants.

15 35. The medication chamber of claim 32 wherein the outer housing is formed as two interengageable sections.

36. The medication chamber of claim 35 wherein the two sections are screw
20 threadably engageable.

37. The medication chamber of claim 32 wherein the therapeutic agent is any one of more of salbutamol, beconase, adrenaline, aminophylline or glucose.

25 38. The medication chamber of claim 32 wherein the therapeutic agent is held in a pressurised container having a release valve, the pressurisable container locatable inside the outer housing.

39. The medication chamber of claim 32 wherein the mounting means comprises one or more recesses or slots for receiving a fixing or locating device
30 such as a screw and/or a guide tab.

- 42 -

40. The medication chamber of claim 32 wherein the at least one delivery path is an outlet channel in communication with the release valve of the pressurised container.

5 41. The medication chamber of claim 38 wherein the releasing means includes a rotatable dial for activating a cammed mechanism to displace the canister and operate the release valve to thereby discharge a dose of therapeutic agent.

10 42. The medication chamber of claim 38 wherein the cammed mechanism operates a slidable seat to activate the release valve of the pressurised canister.

43. The medication chamber of claim 41 or claim 42 wherein the releasing means includes a pressure activated button for displacing the canister or the seat and activating the release valve.

15 44. The medication chamber of claim 32 wherein the releasing means comprises a mechanism for delivering a powder to the air pathway.

20 45. The medication chamber of claim 44 wherein the mechanism comprises a geared arrangement for advancing and opening a blister pack to present the powdered agent contained therein to the air pathway.

46. The medication chamber of claim 44 wherein the mechanism comprises a rotatable dispenser for dispensing a powdered agent to the air pathway.

25 47. The medication chamber of claim 44 wherein the mechanism further comprises valve means operable to open or close the delivery pathway.

48. The medication chamber of claim 32 wherein the air channelling device is 30 one or more of a regulator for scuba diving, a snorkel, a breathing apparatus such as a respirator, a mask, an air conduit or a rebreathing device.

WO 2004/045720

PCT/AU2003/001526

- 43 -

49. The medication chamber of claim 48 wherein the air conduit is positionable in engagement with the medication chamber and adapted to discharge directly into a user's mouth or nose.

5

50. The medication chamber of claim 49 wherein the conduit has an angular deviation in an internal lumen.

51. The medication chamber of claim 46 wherein the conduit further comprises 10 a cap mounted to its external outlet and adapted for removal for use.

52. The medication chamber of claim 51 wherein the cap occludes an accessory air inlet aperture which is cleared by removal of the cap to provide a flow pathway to entrain the therapeutic agent.

15

53. The medication chamber of claim 32 wherein the outer housing includes indicator means for indicating, at least approximately, the content status of the therapeutic agent in the internal chamber and/or the number of doses of therapeutic agent which have been dispensed.

20

54. The medication chamber of claim 32 wherein the outer housing further comprises an inlet pathway for receiving a pressurised air supply into the chamber.

25 55. The medication chamber of claim 54 wherein the outer housing further comprises an outlet valve for discharging air from the internal chamber when air pressure inside the chamber exceeds the pressure outside the chamber.

56. The medication chamber of claim 32 wherein the outer housing is insulated 30 to resist thermal fluctuations.

- 44 -

57. A method of medicating an air stream in a breathing apparatus, the method comprising the steps of mounting a chamber containing a therapeutic agent to a breathing apparatus and introducing one or more doses of the therapeutic agent into an inlet pathway for inspiratory air.

5

58. The method of claim 57 wherein mounting the chamber may comprise forming the chamber integrally with the breathing apparatus.

59. The method of claim 57 wherein mounting the chamber includes the step of
10 forming a separate chamber and reversibly mounting it to the breathing apparatus.

60. The method of claim 57 further including the step of positioning a container holding the therapeutic agent in the chamber.

15 61. The method of claim 60 wherein the container is a pressurised container.

62. The method of claim 57 wherein the step of introducing one or more doses of the therapeutic agent may include the step of activating an agent releasing mechanism by depressing a button or rotating a control dial or knob.

20

63. The method of claim 57 wherein the step of introducing one or more doses of the therapeutic agent into an inlet pathway may comprise the step of introducing the therapeutic agent directly into the inlet pathway from the chamber or through a delivery air pathway from the chamber to the inlet pathway.

25

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.